



CONNECTION



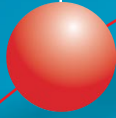
AUTOMATION



CONTROLS



PROTECTION



# Timers, flashers



**entrelec**<sup>®</sup>

# Timers, flashers 7

## Table of contents

### TIMERS



**MULTIFUNCTION**  
Pages 1245-1260

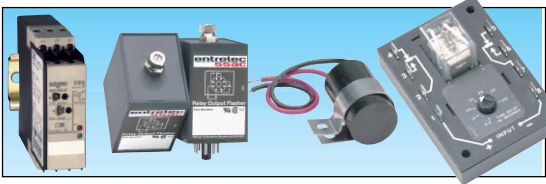


**PROGRAMACUBE™**  
Pages 1261-1277



**SINGLE FUNCTION**  
Pages 1279-1385

### FLASHERS/RECYCLING TIMERS



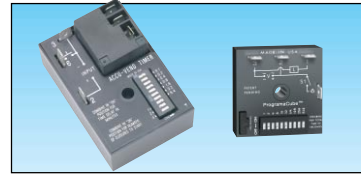
Pages 1387-1407

### HVAC/R TIMERS



Pages 1409-1416

### VENDING TIMERS



Pages 1417-1421

### ACCESSORIES

<b>Adjustment</b> options and dials .....	1426
<b>Brackets, DIN rail, sockets</b> .....	1424
<b>Mounting</b> methods, terminals, varistors .....	1425
<b>Potentiometers</b> , covers, adapter .....	1428
Potentiometers, dials, selection chart .....	1427

### TIMERS

<b>Anti-chatter delay</b> .....	1293, 1299, 1411
<b>Bypass</b> timing .....	1302-1305
<b>Delay</b> on energization [see delay on make (operate)]	
Debouncing delay, switch .....	1299, 1301
Dispensing timer (see single shot)	
Dust collector timer .....	1406
Function - selecting a timer's .....	1240-1244
<b>Load</b> limit curves .....	1429
<b>Mechanical Outline</b> , S, E & C Timers .....	1428
Modes of operation .....	1240-1244
<b>Multifunction timers, DIN rail mount</b>	
4 timing functions .....	1260
5 timing functions .....	1258-1259
6 timing functions .....	1251, 1255-1257
8 timing functions .....	1247-1250
<b>Multifunction timers, plug-in mount</b>	
6 timing functions .....	1254
21 timing functions .....	1252-1253
<b>On delay timers</b> [see delay on make (operate)]	
One-shot (see single shot)	
Operation - timers .....	1240-1244
<b>Part winding start timer</b> .....	1293, 1299
Postpurge delay .....	1309, 1315, 1323-1324, 1326
Prepurge delay .....	1292, 1294, 1299

### Programmable timers, PCSP,

encapsulated, universal mount	
10 timing functions .....	1264-1265, 1270-1273
11 timing functions .....	1262-1263, 1266-1269
12 timing or counting functions .....	1274-1277
<b>Random</b> start delay .....	1283, 1292, 1299
<b>S series</b> timers, connection diagrams .....	1432
S series timers, description .....	1432
Selecting a timer function .....	1240-1244
<b>Selection guide</b> , solid-state timers .....	1238-1239
<b>Selection guide</b> , time delay relays	
with relay outputs .....	1236-1237
Sequencing OFF [see delay on break (release)]	
<b>Single function timers, DIN rail mount</b>	
Delayed interval (pulse generator) .....	1380
Delay on operate (make) .....	1280-1282, 1288, 1291
Delay on operate (make) and on	
release (break) .....	1376-1378
Delay on release (break) .....	1306-1308, 1313, 1316-1318
Recycling (pulse generator) .....	1365
Single pulse on operate (interval) ...	1348-1349, 1353
Single pulse on release (break) .....	1344-1346
Star-delta timer .....	1382-1385
<b>Single function timers, encapsulated, universal mount</b>	
Delayed interval .....	1381
Delay on make (operate) .....	1286-1287, 1290, 1292-1301
Delay on make, normally closed .....	1302-1305
Delay on break (release) .....	1312, 1315, 1319-1322, 1325-1326
Interval and single shot .....	1331, 1352
Interval, delay on break .....	1323-1324, 1359-1360
Interval, single pulse on operate .....	1351, 1354-1358, 1361-1364

Motion detector,	
retriggerable single shot .....	1340-1343
Percentage timing module .....	1374-1375
Recycling (pulse generator) .....	1367-1373
Single shot (pulse former) .....	1330, 1332-1339
<b>Single function timers, open board construction</b>	
Delay on make (operate) .....	1289
Delay on break (release) .....	1314
Single shot (pulse former) .....	1332
<b>Single function timers, PC mount or wire leads</b>	
Delay on make (operate) .....	1301
<b>Single function timers, plug-in base</b>	
Delay on make (operate) .....	1283-1285
Delay on make (operate) and	
on break (release) .....	1379
Delay on break (release) .....	1309-1311
Interval, single pulse on operate .....	1350
Recycling (pulse generator) .....	1366
Single shot, interval (pulse former) .....	1327-1329
Staging ON delay .....	1283, 1292
Staging ON and Staging OFF .....	1376-1379, 1416
Standards and approvals .....	1429
<b>Technical data for C &amp; E timers</b> .....	1433
<b>Technical data for S timers</b> .....	1430-1431
Timing functions, descriptions .....	1240-1244
Trailing edge single shot .....	1344-1347
<b>Watchdog timer</b> .....	1252, 1254, 1264, 1270, 1340-1341, 1343
<b>Zero speed switch</b> .....	1252, 1254, 1264, 1270, 1340-1341, 1343

*continued on next page*

# 7 Timers, flashers

## Table of contents

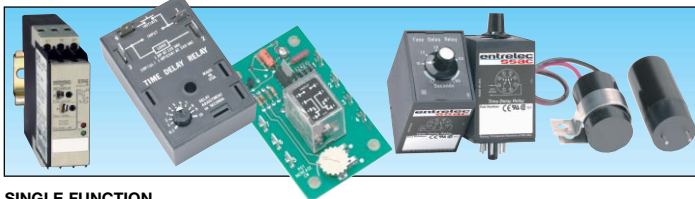
### TIMERS



**MULTIFUNCTION**  
Pages 1245-1260

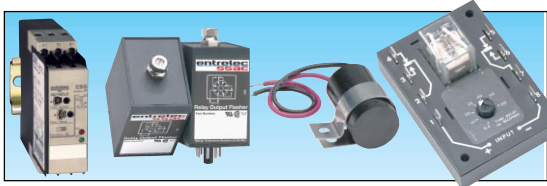


**PROGRAMACUBE™**  
Pages 1261-1277



**SINGLE FUNCTION**  
Pages 1279-1385

### FLASHERS/RECYCLING TIMERS



Pages 1387-1407

### HVAC/R TIMERS



Pages 1409-1416

### VENDING TIMERS



Pages 1417-1421

### FLASHERS/RECYCLING TIMERS

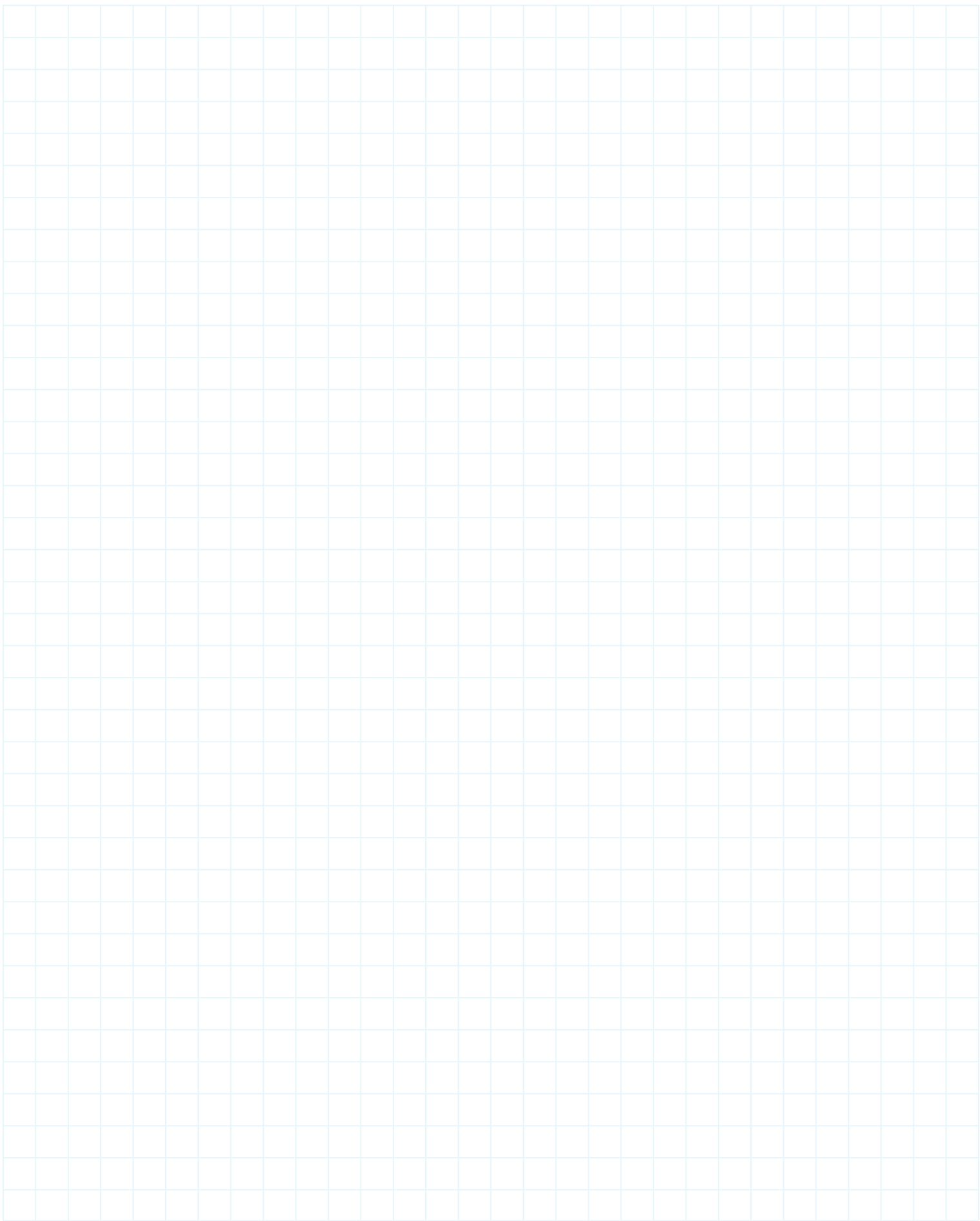
<b>Beacon flasher</b> .....	1733
<b>Flashers/Recycling timers, DIN rail mount</b>	
Starting with off .....	1390-1391, 1395
Flashers/Recycling timers, encapsulated, universal mount	
Alternating .....	1405
Chaser .....	1407
DC .....	1402-1403
Digital, high power output .....	1398
Digital, timer .....	1396-1399
Econo-timer .....	1393
Medium/high power output .....	1401
Power timer .....	1394
Sequencer .....	1406
Universal .....	1400
Flashers/Recycling timers, plug-in mount	
Flasher, relay output .....	1392
Flashers/Recycling timers, tubular with leads	
Low cost .....	1404
<b>Marquee flasher</b> .....	1407
<b>Selection guide</b> .....	1388-1389
<b>Tower flasher</b> .....	1733

### HEATING, VENTILATING, AIR CONDITIONING/REFRIGERATION TIMERS, HVAC/R

<b>Bypass timing</b> .....	1415
<b>Defrost timer</b> .....	1262
<b>Fan delay</b> .....	1323-1324, 1416
<b>HVAC/R timers, encapsulated, universal mount</b>	
Delay on make/delay on break .....	1416
Delay on make (operate) .....	1411, 1415
Lockout .....	1413-1414
Lockout with random start .....	1412
<b>Prepurge delay</b> .....	1292
<b>Part winding start timer</b> .....	1299
<b>Random start delay</b> .....	1292, 1299, 1411
<b>Selection guide</b> .....	1410
<b>Star delta timer</b> .....	1382-1385

### VENDING TIMERS

<b>Coin/token counter</b> .....	1420-1421
<b>Coin vending timer</b> .....	1418
<b>Dispense timers</b> .....	1418-1421
<b>Preset counter</b> .....	1420-1421
<b>Programmable</b> .....	1420-1421
<b>Single shot</b> .....	1419



## Time Delay Relays with Relay Outputs Selection Guide

### Directions:

- 1.) Select the style of product packaging you require.
- 2.) Review the general features of that product.
- 3.) For each function required, find the product name and catalog page number on the same row line.

If the row is blank, reference the available multifunction units.

Note: If multiple units are offered, the function is repeated accordingly.

For detailed product specifications, refer to catalog pages.

### S Series Knob Adjust



22.5 x 78 x 101 mm  
0.89 x 3.07 x 3.98 inches

### Plug-in Switch Adjust



45.2 x 60.7 x 81.3 mm  
1.78 x 2.39 x 3.20 inches

### Plug-in Knob Adjust



45.2 x 60.7 x 91.6 mm  
1.78 x 2.39 x 3.62 inches

### General Features:

DIN Rail Mounting	•	Socket Required	Socket Required
Surface Mounting	Adaptor Required	Socket Required	Socket Required
DPDT Relay	Some units 4 A Contacts	10 A Contacts	10 A Contacts
SPDT Relay	4 A Contacts	Some Units 10 A Contacts	Some Units 10 A Contacts
Instantaneous Relay	Some units (i) 4 A Contacts		
Screw Terminals	•		
Spring Terminals			
8 or 11 Pin Plug-In (Socket Required)		•	•
Quick Connects			
≅Time Delay Range	Most series 0.05 s to 300 h	Most series 0.1 s to 2.8 h; TRDU to 1705 h	Most series 0.05 s to 10 m; TRU 16 h
Repeat Accuracy	< 0.2%	+/- 0.1%	+/- 0.1 to +/- 2%
Popular AC & DC Voltages	•	•	•

### Time Delay Adjustment

Knob Adjust	•		•
Switch Adjust		•	
External Adjust	Some Series		TR Series
Factory Fixed			TR & PR Series

### Multifunction

	Series	Page #	Series	Page #	Series	Page #
21 Functions			TRDU	1252-1253		
8 Functions	MFS (i & a)	1247				
8 Functions	MBS (i)	1250				
6 Functions	MBS (a)	1251			TRU	1254
4 Functions						

### Single Function






Delay on Make (ON Delay)	ERS	1280	TDM	1283	TRM	1284
Delay on Make (ON Delay)	ERS (a)	1281			PRLM	1285
Delay on Make & Instantaneous	ERS (i)	1282				
Interval (Single Pulse on Operate)	VWS	1348	TDI	1350	TRS	1328
Interval (Single Pulse on Operate)	VWS	1349			PRLS	1329
Recycling (Pulse Generator)	TGS	1365	TDR	1366		
Recycling (Pulse Generator)						
Single Shot (Pulse Former)	AWS (te)	1344	TDS	1327	TRS	1328
Single Shot (Pulse Former)	AWS (te)	1345			PRLS	1329
Delay on Break (On Release)	AHS	1306	TDB	1309	TRB	1310
Delay on Break (On Release)	APS	1308			PRLB	1311
Delay on Break (On Release)	ARS (tb)	1316				
Delay on Make / Delay on Break	EAS (i & e)	1376	TDMB	1379		
Delay on Make / Delay on Break	EVS (a)	1378				
Star Delta	YDAV	1384				
Star Delta	YDEW	1385				
Flasher (Recycling Equal Times)	EBS (e)	1390			FS500	1392
Flasher (Recycling Equal Times)	EBS (e)	1391				
Delayed Interval (Single Pulse Generator)	PGS	1380				

### See Flashers Selection Guide Pages 1388-1389

(a) = includes time accumulation; (e) = equal time delays; (f) = function(s) must be ordered; (i) = includes an instantaneous contact; (r) = retriggerable; (tb) = true delay on break; (te) = single pulse on break (trailing edge triggered); A = amps resistive rating



**Time Delay Relays with Relay Outputs Selection Guide**

E & C Series Knob Adjust		HRD Series Knob Adjust		ERD Series Knob Adjust		OR Series Knob Adjust		KR Series Knob Adjust	
									
22.5 x 78 x 78.5 mm 0.89 x 3.07 x 3.09 inches		51.3 x 76.7 x 38.1 mm 2.02 x 3.02 x 1.50 inches		63.5 x 88.9 x 43.2 mm 2.50 x 3.50 x 1.70 inches		53.9 x 93.7 x 47.8 mm 2.12 x 3.69 x 1.88 inches		50.8 x 50.8 x 30.7 mm 2.0 x 2.0 x 1.21 inches	
●		●		●		●		●	
Adaptor Required		Adaptor Required						Adaptor Required	
4 A Contacts		Some SPST 15 A Contacts		Some units 10 A Contacts 10 A Contacts		Some units 10 A Contacts 10 A Contacts		10 A Contacts	
E Series P/Ns C Series P/Ns									
●		●		●		●		●	
Most series 0.1 s to 300 s < 1%		Most series 0.2 s to 100 m +/- 0.5%		Most series 0.1 s to 500 m +/- 0.5%		Most series 0.05 to 300 s +/- 2%		Most series 0.1 s to 1000 m +/- 0.5 to 1.0%	
●		●		●		●		●	
								ORB, ORS AC Only	
●		●		●		●		●	
		●		●		●		●	
		●		●		●		●	
		●		●		●		●	
								KRP Series	
								●	
Series	Page #	Series	Page #	Series	Page #	Series	Page #	Series	Page #
MFE	1255							KRPS (f)	1264-1265
								KRPD (f)	1262-1263
ERE, ERC	1288	HRDM	1286	ERDM	1287	ORM	1289	KRDM	1290
								KRPS	1264-1265
VWE, VWC	1353	HRDI	1351	ERDI	1331	ORS	1332	KRDI	1354
		HRDR	1367					KRPS	1264-1265
								KRDR	1368
AWE, AWC (te)	1346	HRDS	1330	ERDI	1331	ORS	1332	KRPD	1262-1263
AHE, AHC	1313	HRD9 (r)	1340			ORB	1314	KRDS	1333
ARE, ARC (tb)	1317	HRDB	1312					KRD9 (r)	1341
								KRDB	1315
								KRPS	1264-1265
								KRPD	1262-1263
YDE, YDC	1382								
SDE, SDC	1383								
EBE, EBC (e)	1395	HRD3 (e)	1394	ERD3 (e)	1393			KRD3 (e)	1396
								KRPD	1262-1263

(a) = includes time accumulation; (e) = equal time delays; (f) = function(s) must be ordered; (i) = includes an instantaneous contact; (r) = retriggerable; (tb) = true delay on break; (te) = single pulse on break (trailing edge triggered); A = amps resistive rating

## Solid-State Timers Selection Guide

### Directions:

- 1.) Select the style of product packaging you require.
- 2.) Review the general features of that product.
- 3.) For each function required, find the product name and catalog page number on the same row line.

If the row is blank, reference the available multifunction units.

Note: If multiple units are offered, the function is repeated accordingly.

For detailed product specifications, refer to catalog pages.

### E & C Series Knob Adjust



22.5 x 104 x 83 mm  
0.89 x 4.09 x 3.27 inches

### MicroTime Knob Adjust or Switch Adjust



17.5 x 76.2 x 61.2 mm  
0.69 x 3.0 x 2.41 inches

### Digi-Timer Knob, Switch, Fixed or External Adjust



63.5 x 88.9 x 31 mm  
2.50 x 3.50 x 1.22 inches

### General Features:

DIN Rail Mounting	•	•	•
Surface Mounting	Adaptor Required	•	•
Output Rating	0.7 to 0.8 A Steady	0.7 A Steady	1 A Steady
Popular AC Voltages	•	•	•
Popular DC Voltages	AKC, AKE AC Only	•	•
Screw Terminals	E series P/N	•	•
Spring Terminals	C series P/N	•	•
Quick Connects	•	•	•
Typical Time Delay Range	Most series 0.1 to 300 s	AS_U 0.1 s to 100 m; DS_U 0.1 s to 63 m	Most series 0.1 s to 500 m
Repeat Accuracy	≤ 1%	+/- 0.1 to 1%	+/- 0.5%

### Time Delay Adjustment

Knob Adjustment	•	AS_U Series	ESDR, SQ & PT Series
Switch Adjustment		DS_U Series	TDU_ Series
External Adjustment			All except TDU_ Series
Factory Fixed			Except PT & TDU_

### Multifunction

	Series	Page #	Series	Page #	Series	Page #
5 Functions			ASQU/ASTU	1258		
5 Functions			DSQU/DSTU	1259		
4 Functions	MKE, MKC	1260				

### Single Function

Delay on Make (ON Delay)	EKE, EKC	1291				
Delay on Make (ON Delay)						
Delay on Make (ON Delay)						
Delay on Make (ON Delay)						
Delay on Make Normally Closed						
Delay on Make Normally Closed						
Delay on Break (On Release)	AKE, AKC	1318			TDUB	1319
Delay on Break (On Release)					EISB (i)	1326
Delay on Break (2 Terminal)					TDUS	1334
Single Shot (Pulse Former)						
Single Shot (Pulse Former)						
Single Shot (Motion Detector)					EIS9 (i) (r)	1343
Interval (Single Pulse on Operate)					TDOI	1355
Interval (Single Pulse on Operate)						
Interval (DC Volts Only)						
Interval (2 Terminal)						
Recycling (Delays Separately Adjustable)					ESDR	1370
Recycling (Delays Separately Adjustable)						
Recycling (Equal Delays)					SQ (s) (e)	1406
Recycling (Equal Delays)						
Flasher (ON First)						
Flasher (OFF First)						
Percentage					PT	1375
Delay on Make/ Delay on Break						
Delay on Make/Interval					ESD5	1381

(a) = includes time accumulation; (d) = DC Volts Only; (e) = equal time delays; (f) = ICSP ProgramaCube function is selected when ordered

## Solid-State Timers Selection Guide

### Digi-Timer Switch, Fixed, or External Adjust



50.8 x 50.8 x 30.7 mm  
2.0 x 2.0 x 1.21 inches

### Knob, Fixed, or External Adjust



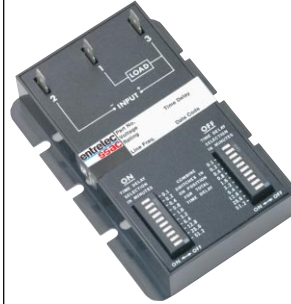
50.8 x 50.8 x 30.7 mm  
2.0 x 2.0 x 1.21 inches

### Digi-Power Knob, Fixed or External Adjust



50.8 x 50.8 x 38.4 mm  
2.0 x 2.0 x 1.51 inches

### Digi-Set Switch Adjust



79.3 x 114.3 x 34.3 mm  
3.12 x 4.5 x 1.35 inches

### PC Mount / Wires Fixed



23.8 x 38.1 mm  
0.94 x 1.5 inches

Adaptor Required

•

1 A Steady

•

Mount

•

Most series 0.1 s to 1000 m; some 166h  
+/- 0.1 to 1%

KSP\_ Series

TDU Series

•

Adaptor Required

•

1A Steady

•

Most series 0.05 to 600 s  
+/- 2%

TMV Series

•

6, 10, or 20 A Steady

•

Most series 0.1 s to 1000 m  
+/- 0.5 to 2%

FSU Series

•

1 A Steady

•

0.1 s to 255.75 h  
+/- 0.1%

•

0.5 A Steady

•

6" Wire Leads or PC Board

0.05 to 180 s  
+/- 5%

Series	Page #
KSPS (f)	1270-1271
KSPD (f)	1266-1267
KSPU (f)	1274-1275

Series	Page #
TMV/TSU	1294
TS1	1299
TS4	1305
TSB	1325
TSS	1338
TS2	1362
TS6 (d)	1364

Series	Page #
THDM	1296
THD1	1297
TH1	1300
THD4	1303
THDB	1321
THDS	1336
THS	1339
THD2	1357
TH2	1363
THD7	1324
PTHA	1373
THD3	1398
FSU1000	1400
PTHF	1374

Series	Page #
RS	1369

Series	Page #
MSM	1301

TDU	1292
KSDU	1293
TSD1	1295
KSD1	1298
TSD4	1302
KSD4	1304
TSDB	1320
KSDB	1322
TSD7	1323
TSDS	1335
KSDS	1337
KSPS (r)	1270-1271
TSD2	1356
KSD2	1361
TSD6 (d)	1358
TSD7	1323
TSDR	1371
KSDR	1372
TSD3 (e)	1397
KSD3 (e)	1399
KSPS (e)	1270-1271

KSPD	1266-1267
KSPD (a)	1266-1267

(i) = Optically isolated between input and output; (r) = retriggerable; (s) = 3 or 4 channel sequencer



# Timers: Functions

## Selecting A Timer's Function

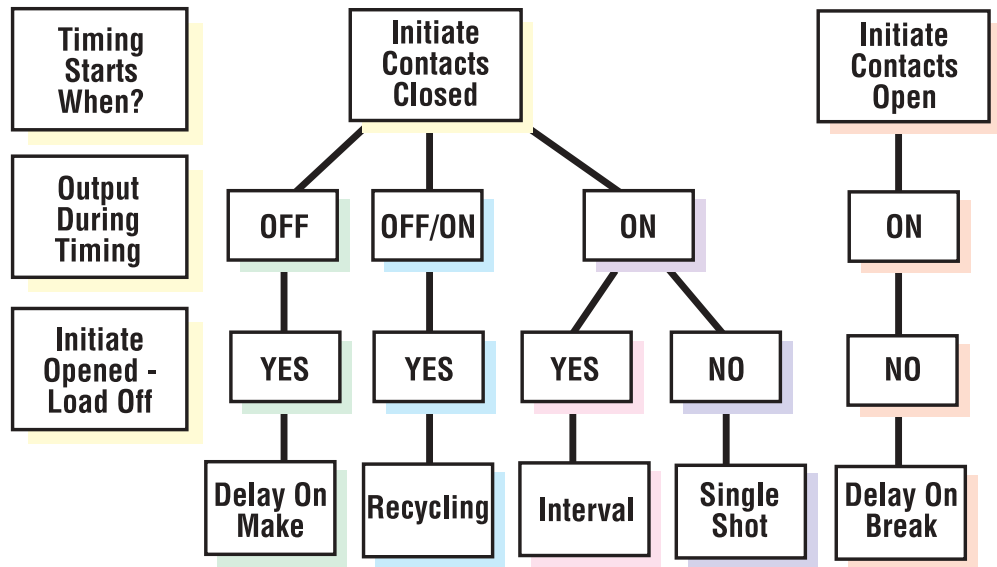
Selecting one of the five most common timing functions can be as easy as answering three questions on the chart below. If you have trouble answering these questions, try drawing a connection diagram that shows how the timer and load are connected. Time diagrams and written descriptions of the five most popular functions, plus other common modes, appear on the following pages. Instantaneous contacts, accumulation, stop timing functions, and blinking LEDs are included in some units to expand the versatility of the timer. These expanded operations are explained on the product's catalog page. Two styles of time diagrams are used on these pages along with text and international symbols for functions. A legend is included for each style.

### Function Selection Guide

#### THE FIVE MOST USED FUNCTIONS

##### SELECTION QUESTIONS

- 1) The timing starts when the initiate (starting) contacts are
  - A) Closed B) Opened
- 2) What is the status of the output (or load) during timing?
  - A) On B) Off C) On/Off
- 3) Will the load de-energize (or remain de-energized) if the initiate (starting) contacts are opened during timing?
  - A) Yes B) No



### Understanding Time Diagrams

Time diagrams are used to show the relative operation of switches, controls, and loads as time progresses. Time begins at the first vertical boundary. There may be a line indicating the start of the operation or it may just begin with the transition of the device that starts the operation. Each row in the time diagram represents a separate component. These rows will be labeled with the name of the device or its terminal connection numbers. In a bistable or digital system, the switches, controls, or loads can only be ON or OFF. The time lines are drawn to represent these two possible conditions. Vertical lines are used to define important starting or ending points in the operation.

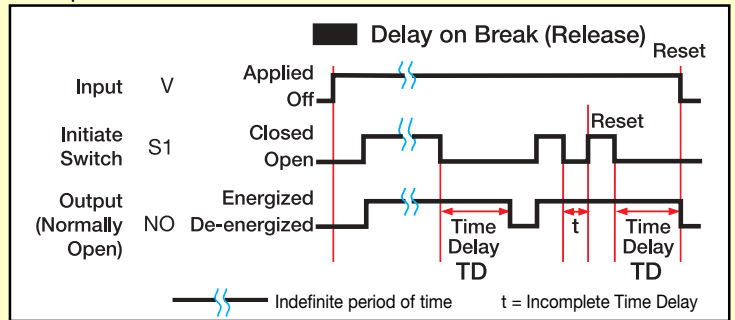
Two styles of time diagrams are used in this catalog.

1.) The first style (example #1) is the most common type in use in North America. It shows the energizing of loads, and the closing of switches and contacts by an ascending vertical transition of the time line. Opening switches or contacts or de-energizing loads are represented by descending vertical transitions.

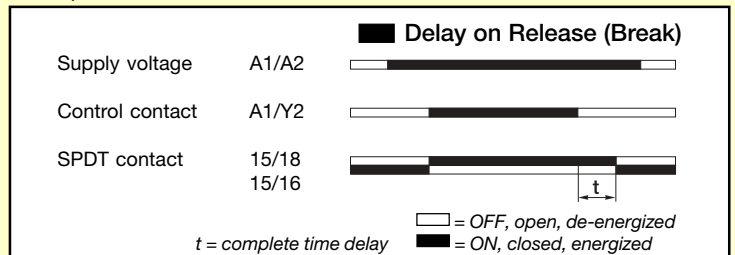
2.) The second style (example #2) is more often found with European equipment. In this diagram the row line remains in one location and the ON/OFF transitions are shown by the use of color. White is used to show OFF, open, or de-energized and black is used to show ON, closed, or energized.

#### TIME DIAGRAMS

Example 1




























Example 2



## Timers: Popular Functions

### INTERNATIONAL TIMING FUNCTION SYMBOLS

-  = Delay on Make; Delay on Operate
-  = Delay on Break; Delay on Release
-  = Delay on Make & Break; Delay on Operate & Release
- 1   = Interval; Single Pulse on Operate
- 1   = Trailing Edge Interval (Single Shot); Single Pulse on Release
-  = Single Shot; Pulse Former
-   = Flasher - ON Time First; Recycling Equal Times - ON First
-   = Flasher - OFF Time First; Recycling Equal Times - OFF First
-   = Recycling - Unequal Times; Pulse Generator
-   = Recycling - Unequal Times Starting with ON or OFF
-   = Delay on Make & Interval; Single Pulse Generator
-   = Star-delta Motor Starting - Twice Delayed on ON
-  1   = Star-delta Motor Starting - with Wiper Function
-   = Star-delta Motor Starting

### TIME DIAGRAMS

### DELAY ON MAKE

(Delay on Operate, On Delay, Operate Delay, Delay On, Prepurge Delay)

**OPERATION:** Upon application of input voltage, the time delay begins.

The output (relay or solid-state) is de-energized before and during the time delay. At the end of the time delay, the output energizes and remains energized until input voltage is removed.

**RESET:** Removing input voltage resets the time delay and output.

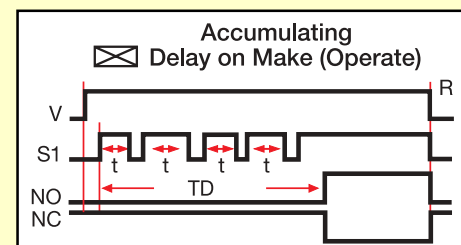
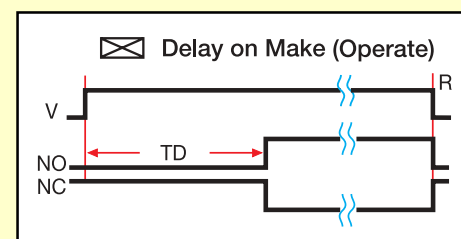
#### Extra Functions Included in Some DOM Timers:

**Instantaneous Contacts:** Some DOM timers have a set of instantaneous contacts in addition to the delayed contacts. Instantaneous contacts energize when input voltage is applied and remain until voltage is removed. **See: MFS, MBS, ERS**

**Accumulating Time Delay Feature:** Some DOM timers allow the time delay to be stopped and held and then resumed by opening and closing an external switch.

**See: MFS, MBS, ERS, TRDU, KSPS, KSPD, KRPS, KRPD**

**Delay on Make, Normally Closed Output:** All relay output timers with normally closed contacts include this function. This function is also available in solid state output timers. **SEE: TS4, TSD4, KSD4, THD4**



### INTERVAL

(Single Pulse on Operate, On Interval, Interval On, Pulse Shaping, Bypass Timing)

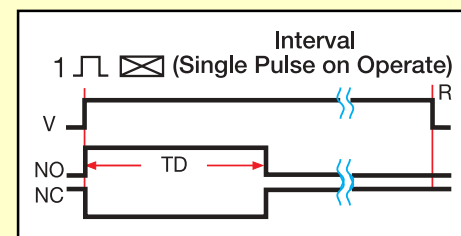
**OPERATION:** Upon application of input voltage, the time delay begins. The output (relay or solid state) is energized during the time delay. At the end of time delay the output de-energizes and remains de-energized until input voltage is removed.

**RESET:** Removing input voltage resets the time delay and output.

#### Extra Functions Included in Some Interval Timers:


**Instantaneous Contacts:** Some Interval timers have a set of instantaneous contacts in addition to the delayed contacts. Instantaneous contacts energize when input voltage is applied and remain until voltage is removed. **See: MFS, MBS, VWS**

**Accumulating Time Delay Feature:** Some Interval timers allow the time delay to be stopped and held and then resumed by opening and closing an external switch. **See: MFS, MBS, VWS**



V = Voltage  
R = Reset  
TD = Time Delay  
S1 = Initiate Switch

NO = Normally Open Contact  
NC = Normally Closed Contact  
t = Incomplete Time Delay

 Indefinite period of time

## Timers: Popular Functions (cont.)

### RECYCLING

(Flasher, Pulse Generator, Recycle Timing, Repeat Cycle, Duty Cycling)

**OPERATION:** Upon application of input voltage, the output (relay or solid-state) energizes and the ON time begins. At the end of the ON time, the output de-energizes and the OFF time begins. At the end of the OFF time, the output energizes and the cycle repeats as long as input voltage is applied. The OFF time may be the first delay in some recycling timers.

**RESET:** Removing input voltage resets the output and time delays, and returns the sequence to the first delay.

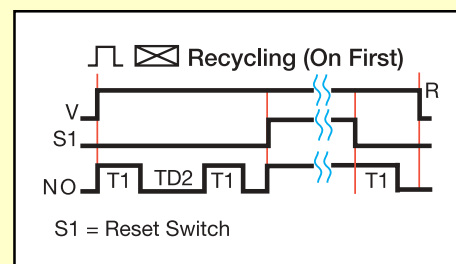
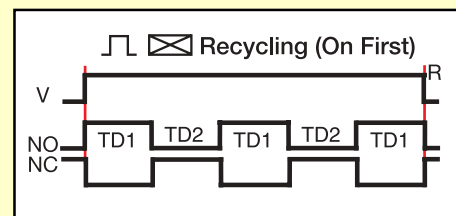
#### Extra Functions Included in Some Recycling Timers:

**Instantaneous Contacts:** Some Recycling timers have a set of instantaneous contacts in addition to the delayed contacts. Instantaneous contacts energize when input voltage is applied and remain until voltage is removed. **See: MFS, MBS, EBS**

**Reset Switch:** Closing an external switch transfers the output and resets the sequence to the first delay. **See: MFS, MBS, EBS, HRDR**

**Accumulating Time Delay Feature:** Some Recycling timers allow the time delay to be stopped and held and then resumed by opening and closing an external switch. **See: TGS**

### TIME DIAGRAMS



### DELAY ON BREAK

(Delay on Release, Off Delay, Release Delay, Postpurge Delay)

**OPERATION:** Input voltage must be applied before and during timing. Upon closure of the initiate switch, the output (relay or solid state) energizes. The time delay begins when the initiate switch is opened. The output remains energized during timing. At the end of the time delay, the output de-energizes. The output will energize if the initiate switch is closed when input voltage is applied.

**RESET:** Reclosing the initiate switch during timing resets the time delay. Removing input voltage resets the time delay and output.

#### Extra Functions Included in Some Delay on Break Timers:

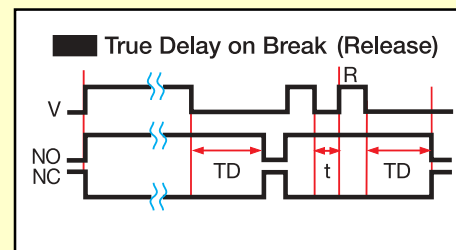
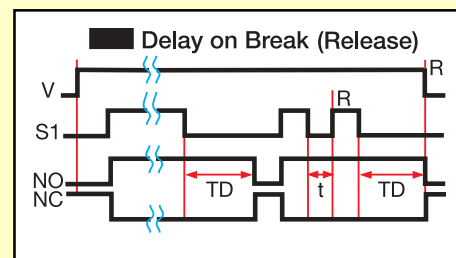
**Instantaneous Contacts:** Some DOB timers have a set of instantaneous contacts in addition to the delayed contacts. Instantaneous contacts energize when input voltage is applied and remain until voltage is removed. **See: MFS, MBS, AHS, APS**

**Accumulating Time Delay Feature:** Some DOB timers allow the time delay to be stopped and held and then resumed by opening and closing an external switch. **See: MFS, MBS, AHS, APS**

#### Related Functions:

**True Delay on Break (delay on release without voltage):** When input voltage is applied, the output energizes. The time delay begins when input voltage is removed. The output de-energizes at the end of the time delay. **See: ARS, ARE**

**Inverted Delay on Break:** The same as delay on break, except the transfer of the output is the inverse of the typical function. **See: TRDU, KRPS, KSPS**



V = Voltage	NO = Normally Open Contact
R = Reset	NC = Normally Closed Contact
TD = Time Delay	t = Incomplete Time Delay
S1 = Initiate Switch	Indefinite period of time

## Timers: Popular Functions (cont.)

### SINGLE SHOT

(Pulse Former, One Shot Relay, Single Shot Interval, Pulse Shaping)

**OPERATION:** Input voltage must be applied before and during timing. Upon momentary or maintained closure of the initiate switch, the output (relay or solid-state) energizes and the time delay begins. At the end of the delay, the output de-energizes. Opening or reclosing the initiate switch during timing has no effect on the time delay. Note (for most single shot timers): if the initiate switch is closed when input voltage is applied, the output energizes and the time delay begins.

**RESET:** Reset occurs when the time delay is complete and the initiate switch is opened. Removing input voltage resets the time delay and output.

#### Extra Functions Included in Some Single Shot Timers:

**Instantaneous Contacts:** Some Recycling timers have a set of instantaneous contacts in addition to the delayed contacts. Instantaneous contacts energize when input voltage is applied and remain until voltage is removed. **See: MFS, MBS, AWS**

**Accumulating Time Delay Feature:** Some recycling timers allow the time delay to be stopped and held and then resumed by opening and closing an external switch. **See: MFS, MBS, AWS**

#### Related Functions:

##### Retriggerable Single Shot (motion detector):

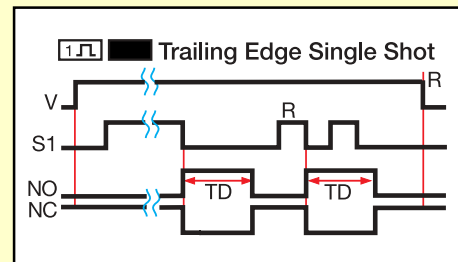
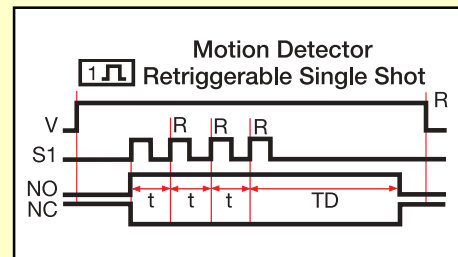
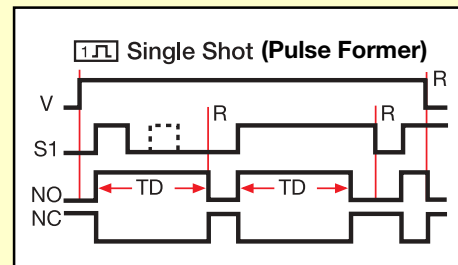
(Motion Detector, Zero Speed Switch, Watchdog Timer, Missing Pulse Timer)  
The time delay is reset each time the initiate switch closes. The output energizes when voltage is applied or when the initiate switch first closes. **See: TRDU, TRU, HRD9, KRD9, KRPS, KSPS, EIS9**

**Inverted Single Shot:** The same as single shot, except the transfer of the output is the inverse of the typical function. **See: TRDU, KRPS, KSPS**

**Trailing Edge Single Shot (single pulse on release with input voltage):** The output energizes and the time delay begins when the initiate switch is opened. **See: MFS, MBS, AWS, TRDU, KSPS, KRPS**

**Single Shot on Loss of Power (single pulse on release without voltage):**  
Upon loss of input voltage, the output energizes for the time delay. **See: AWE**

### TIME DIAGRAMS



V = Voltage  
R = Reset  
TD = Time Delay  
S1 = Initiate Switch  
NO = Normally Open Contact  
NC = Normally Closed Contact  
t = Incomplete Time Delay  
Indefinite period of time

### STAR DELTA - Two Output Relays (Motor Starting Timer)

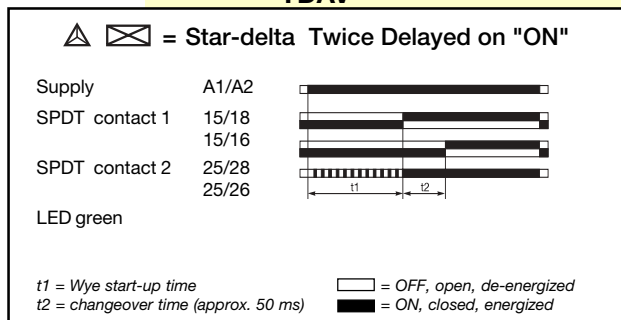
**OPERATION:** Upon application of input voltage, the first output relay energizes and the star contactor is energized. When the time delay is completed, the first relay de-energizes [YDEW] (or remains energized in YDAV). 50 ms later, the second output relay and the delta contactor energize and remain energized until input voltage is removed.

**RESET:** Removing input voltage resets the time delays and outputs.  
**See: MFS, MBS, YDEW, YDAV**

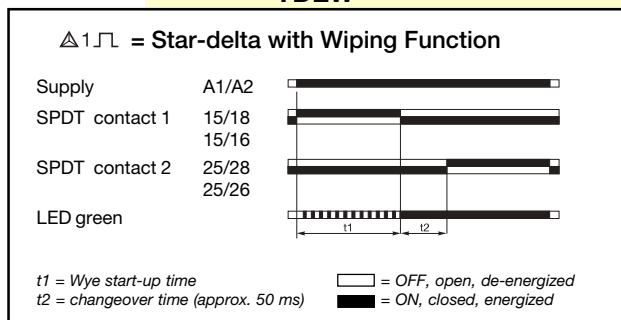
#### Related Functions:

**Star Delta:** SPDT relay connection. **See: YDE, SDE**

### YDAV



### YDEW



## Timers: Dual Functions

### Two Functions in One Timer

#### DELAY ON MAKE / DELAY ON BREAK

(Delay on Operate / Delay on Release, Sequencing ON & OFF, Fan Delay, Prepurge & Postpurge)

**OPERATION:** Input voltage must be applied at all times. The output relay is de-energized. Upon closure of the S1 initiate switch, the delay-on-make time delay (TD1) begins. At the end of TD1, the output relay energizes. Upon opening S1 the delay-on-break time delay (TD2) begins. At the end of TD2, the output relay de-energizes.

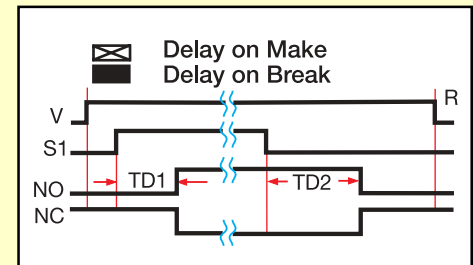
**RESET:** Removing input voltage resets time delays and the output. If S1 is opened during: a) TD1, then TD1 is reset and the output remains de-energized. b) or closed during TD2, then TD2 is reset and the output remains energized.

#### Extra Functions Included in Some DOM/DOB Timers:

**Instantaneous Contacts:** Some DOM/DOB timers have a set of instantaneous contacts in addition to the delayed contacts. Instantaneous contacts energize when input voltage is applied and remain until voltage is removed. **See: EAS**

**Accumulating time delay feature:** Some DOM/DOB timers allow the time delay to be stopped and held and then resumed by opening and closing an external switch. **See: EAS EVS**

#### TIME DIAGRAMS

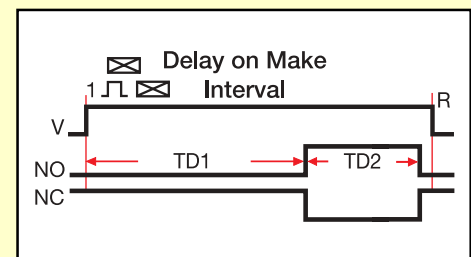


#### DELAY ON MAKE/INTERVAL

(Delayed Interval, Delay on Operate/Single Pulse on Operate)

**OPERATION:** Upon application of input voltage, the delay-on-make time delay (TD1) begins, the output remains de-energized. At the end of this delay, the output energizes and the interval delay (TD2) begins. At the end of the interval delay (TD2), the output de-energizes.

**RESET:** Removing input voltage resets the output, the time delays and returns the sequence to the first delay. **See: PGS, TRDU, KRPD, KSPD, ESD5**



#### OTHER DUAL FUNCTIONS

Delay on Make/Recycling (ON time first, equal times)

Delay on Make/Single Shot

Interval/Recycling (ON time first, equal times)

Single Shot/Recycling (ON time first, equal times)

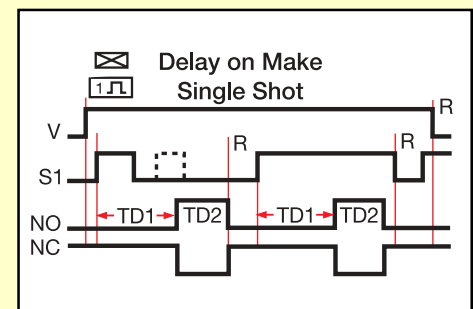
Recycling (Both times adjustable)

Interval/Delay on Make

Accumulative DOM/Interval

See the product catalog pages for the most current listing

**See: KRPD, KSPD**



V = Voltage	NO = Normally Open Contact
R = Reset	NC = Normally Closed Contact
TD = Time Delay	t = Incomplete Time Delay
S1 = Initiate Switch	Indefinite period of time